



Discus (Canaridiscus) rupivagus sp. nov., a rock-dwelling species from La Gomera, Canary Islands (Gastropoda: Pulmonata: Discidae)

WOLFGANG RÄHLE^{1,3} & CHRISTOPH ALLGAIER²

¹Staatliches Museum für Naturkunde, Rosenstein 1, D-70191 Stuttgart, Germany. E-mail: wolfgang.raehle@smns-bw.de

²Institute of Evolution and Ecology, Evolutionary Biology of Invertebrates, University of Tübingen, Auf der Morgenstelle 28, D-72076 Tübingen, Germany. E-mail: christoph.allgaier@uni-tuebingen.de

³Corresponding author

Yanes *et al.* (2011) assume that the endemic Discidae from the Madeiran and Canarian Islands are members of the single genus *Atlantica* Ancy, with *Atlantica* s.str. and *Canaridiscus* Alonso & Ibañez as subgenera. As long as the anatomy of the type-species of *Atlantica* [*Discus guerinianus* (R.T. Lowe) from Madeira] is not known however, we do not follow this designation but maintain the genus *Discus* with the subgenera *Atlantica* and *Canaridiscus*. The subgenus *Canaridiscus* has been established by Alonso & Ibañez (in Yanes *et al.* 2011) for two newly discovered Canarian species, *anagaensis* Ibañez & D. Holyoak from the northeastern Anaga mountains (Tenerife), and *saproxylophagus* Alonso, G. Holyoak & Yanes from the National Park of Garajonay (La Gomera). The most remarkable feature of the new taxon is the genital system with a long or very long penis, unknown in other Discidae. Here we deal with the occurrence of an additional *Canaridiscus* species, living near Casas de Encherada in the eastern part of La Gomera, where it has been found hidden in narrow rock crevices.

Discus (Canaridiscus) rupivagus Rähle & Allgaier, sp. nov.

Diagnosis. The new species can be recognized among all other species of *Discus* living in the palaeartic and nearctic region by its thin, rather large (diameter up to 13 mm), very flattened, sharply keeled and widely umbilicated shell. Spire and body whorl are finely striated. Strong, regular radial ribs, characteristic of the shell surface of most representatives of the genus, are limited to the volutions visible inside the umbilicus.

Type locality (Fig. 1 C): La Gomera, Pista de Hermigua las Casetas, approx. 600 m east of Casas de Encherada, at an altitude of 600 m, low volcanic rocks near the roadside, broken after heavy rainfalls.

Holotype (Fig. 1, A; alcohol specimen): collected by W. Rähle and T. Beck, 7th March 2005, Staatliches Museum für Naturkunde Stuttgart, Germany (ZI0073868).

Paratypes: Same locality, collected by W. Rähle and T. Beck, 7th March 2005; 3 alcohol specimens, and 7 empty shells (mostly juveniles), Staatliches Museum für Naturkunde Stuttgart (ZI0073869); 2 alcohol specimens and 1 empty shell, Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany (SMF 336573).

Etymology. The specific name refers to the living habits of the species.

Habitat and distribution. Up to now, the new species is only known from the type locality. The animals were found in narrow crevices of shattered, northeast exposed volcanic rocks, as well as between stones at the base of these rocks. The species was associated with *Napaeus* aff. *barquini* Alonso & Ibañez, 2006 in Alonso *et al.* (2006), *Plutonia oromii* (Ibañez & Alonso, 1988) in Morales *et al.* (1988) (verified anatomically), *Plutonia falcifera* Ibañez & Groh, 2000 in Alonso *et al.* (2000) (verified anatomically), *Ripkeniella petrophila* Hutterer & Gittenberger, 1998, and *Canariella tenuicostulata* Alonso, Ibañez & Ponte-Lira, 2003.

Description of the shell (Fig. 1 A, D): The shells are lens-shaped, thin and fragile. Their colour is an even horny brown. They are up to 3.5 mm high and up to 13 mm wide, and have up to 5.75 markedly keeled whorls (calculation according to Kerney, Cameron & Jungbluth, 1983). Spire low with flat whorls and shallow sutures. Aperture transverse and slightly triangular; the mouth edge is simple. The keel is bordered just below and above by a narrow flattened zone, which produces a notch at the aperture (Fig. 1 A). The umbilicus shows all volutions inside. Its width reaches approximately one third of the maximum shell diameter. Apart from the 1.5 smoothish whorls of the protoconch, the

surface of the shell is finely and irregularly striated. The whorls visible inside the umbilicus however reveal prominent axial ribs (Fig. 1 D).

Anatomy (Fig. 2; one specimen dissected): In the following description the terms "distal" and "proximal" are used in relation to the hermaphroditic gland. Atrium short. Penis very long and with many convolutions. When expanded its length reaches approximately 43.5 mm. It is five times longer than the complete female part of the genital system with vagina, oviduct, spermooviduct and albumen gland. Proximally the penis is thicker than distally. The retractor muscle inserts at the junction of vas deferens and penis. In its mid-section the vas deferens is linked to the distal penis end by a connective tissue cord. The pedunculus of the small bursa copulatrix is long and thin, and tightly fixed to spermooviduct and free oviduct by connective tissue. The free oviduct is four times longer than the vagina. The well developed albumen gland, clearly distinguished by its grey colour from the white coloured spermooviduct, has a short talon. The hermaphroditic duct is thin and moderately coiled.

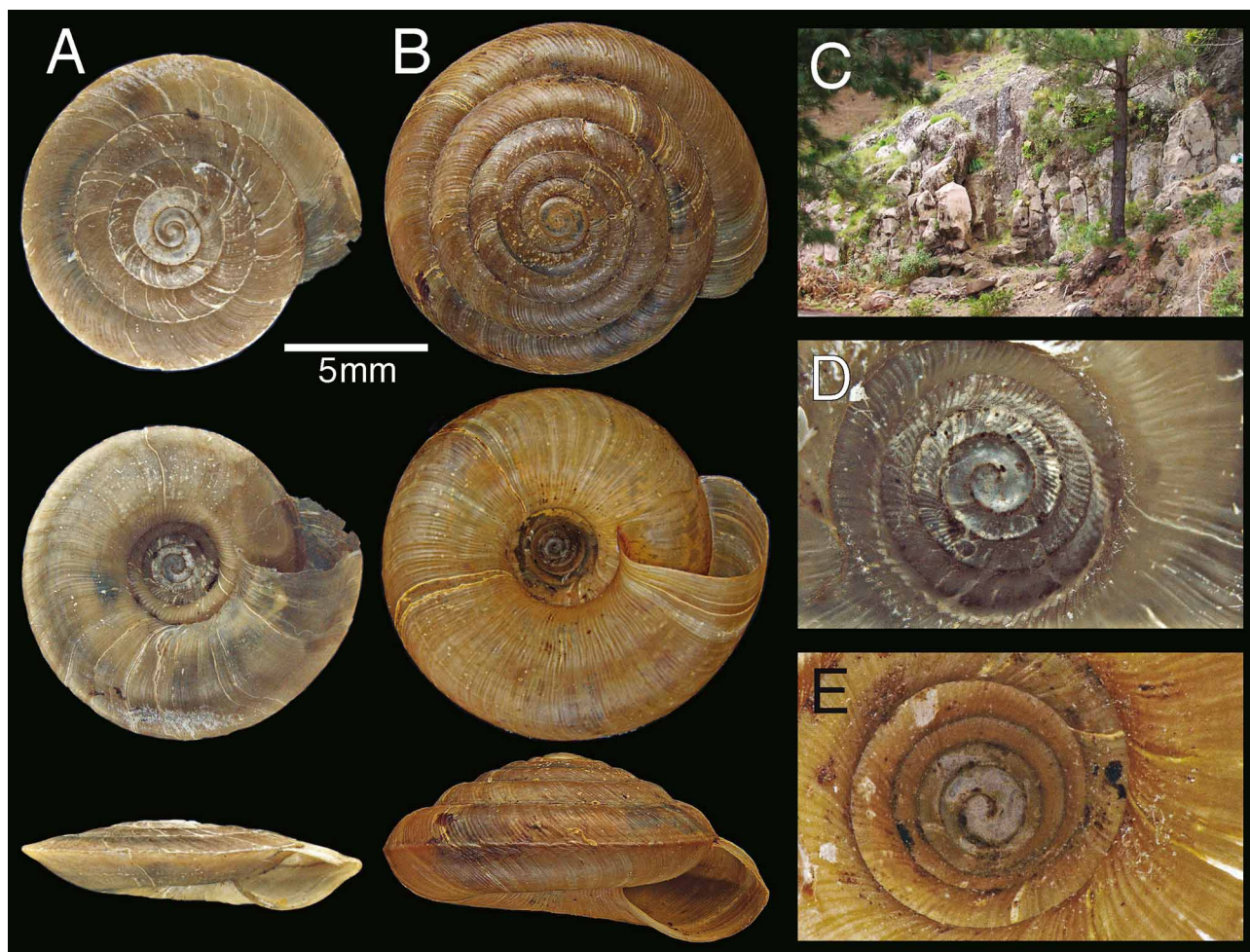


FIGURE 1. A, *Discus (Canaridiscus) rupivagus* sp. nov., shell of the holotype; B, shell of *Discus (Canaridiscus) saproxylaphagus* (Alonso, G. Holyoak & Yanes 2011), La Gomera, Bosque del Cedro, leg. M. Klemm, 17th February 1992 ; C, locus typicus of *Discus rupivagus* sp. nov. near Casas de Encherada; D, *Discus rupivagus* sp. nov., umbilicus of a paratype (magnified); E, umbilicus of *Discus saproxylaphagus* (magnified).

Comparisons. Conchologically *Discus rupivagus* sp. nov. is easy to distinguish from all other Discidae hitherto known from La Gomera. The finely striated shells of *D. ganodus* (J. Mabille) from the laurel forest of El Cedro are smaller (maximum diameter up to 9 mm) and have no keel. They exhibit an elevated spire with convex, slowly increasing whorls, coarsely striated above and finely below. *D. gomerensis* Rähle, which occurs in open woodland outside the laurel forest in the upper part of the Barranco de Era Nueva near Vallehermoso, is another smaller species (shell diameter up to 8 mm). The shell has more than seven very slowly growing whorls, strongly ribbed above and striated below, and the keel is rather blunt and less sharp. The shells of *D. saproxylaphagus* are larger (up to 16 mm wide, 7 mm high), and only weakly keeled. The up to seven slowly increasing whorls are convex, not flattened (Fig. 1 B).

Young specimens of the latter species however have a more pronounced keel and are therefore somewhat similar to the new species. But as in *D. ganodus* and *D. gomerensis*, and in contrast to *D. rupivagus* **sp. nov.**, the whorls inside the umbilicus are striated in the same manner as the remaining underside of the shell (Fig. 1 E).

Anatomically *D. rupivagus* is quite similar to the two other *Canaridiscus* species (Yanes *et al.* 2011). The penis of the larger species (*D. saproxylophagus*) is comparatively longer. With an absolute length of up to 100 mm (expanded) it is more than twice as long as in *D. rupivagus*. In the species from Tenerife (*D. anagaensis*) the penis reaches nearly the same length as in *D. rupivagus*, though *D. anagaensis* is much smaller than the new species from La Gomera. The albumen gland of *D. rupivagus* is normally developed and not small and tiny as described for *D. saproxylophagus* and *D. anagaensis* by Yanes *et al.* (2011: 47–48, Figs. 3 & 4).

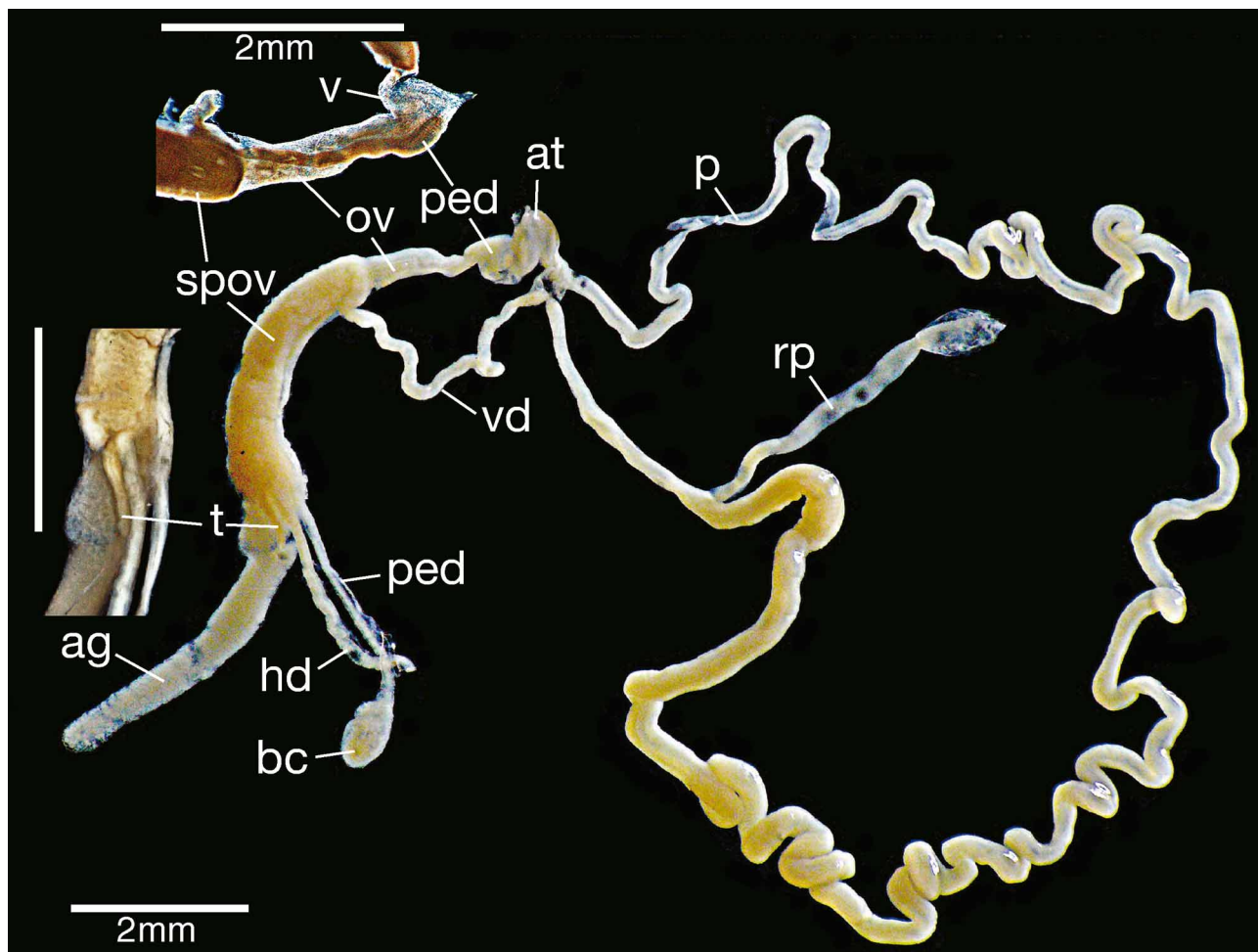


FIGURE 2. *Discus (Canaridiscus) rupivagus* **sp. nov.**, dissected genital system; at, atrium; ag, albumen gland; bc, bursa copulatrix; hd, hermaphroditic duct; ov, free oviduct; p, penis; ped, pedunculus; rp, penis retractor muscle; spov, spermoviduct; t, talon; v, vagina; vd, vas deferens.

Acknowledgements

Our special thanks go to Dr. J. Nebelsick for checking the English, and two anonymous referees for helpful comments.

References

- Alonso, M.R., Valido, M.J., Groh, K. & Ibañez, M. (2000) *Plutonia (Canarivitrina)*, new subgenus, from the Canary Islands, and the phylogenetic relationships of the subfamily Plutoniinae (Gastropoda: Limacoidea: Vitrinidae). *Malacologia*, 42, 39–62.

- Alonso, M.R., Ibañez, M. & Ponte-Lira, C.E. (2003) *Canariella* (*Salvinia*), New Subgenus, and Three New Species of *Canariella* Hesse, 1918 (Gastropoda: Pulmonata: Hygromiidae). *The Veliger*, 46, 69–76.
- Alonso, M.R., Goodacre, S.L., Emerson, B.C., Ibañez, M., Hutterer, R. & Groh, K. (2006) Canarian land snail diversity: conflict between anatomical and molecular data on the phylogenetic placement of five new species of *Napaeus* (Gastropoda, Pulmonata, Enidae). *Biological Journal of the Linnean Society*, 89, 169–187.
- Hutterer, R. & Gittenberger, E. (1998) A dwarf on the rocks: *Ripkeniella petrophila* gen. et spec. nov. (Gastropoda Pulmonata: Hygromiidae), a tiny petrophilous snail from La Gomera, Canary Islands. *Basteria*, 62, 117–122.
- Kerney, M.P., Cameron, R.A.D. & Jungbluth, J.H. (1983) *Die Landschnecken Nord- und Mitteleuropas*. Paul Parey, Hamburg & Berlin, 384 pp.
- Morales, P., Ibañez, M. & Alonso, M.R. (1988) La familia Vitrinidae en Canarias. III. Tres nuevas especies de La Gomera (Gastropoda: Pulmonata). *Archiv für Molluskenkunde*, 118, 153–166.
- Yanes, Y., Holyoak, G.A., Holyoak, D.T., Alonso, M.R. & Ibañez, M. (2011) A new Discidae subgenus and two new species (Gastropoda: Pulmonata) from the Canary Islands. *Zootaxa*, 2911, 43–49.